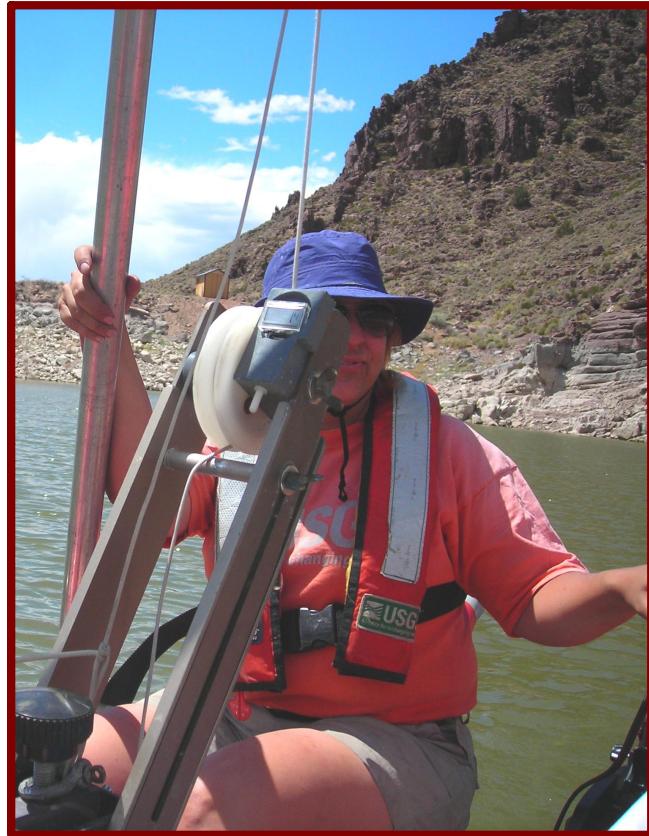


# Mercury in water and sediment cores, Newcastle Reservoir, Utah



*Dave Naftz, USGS, Salt Lake City, UT*

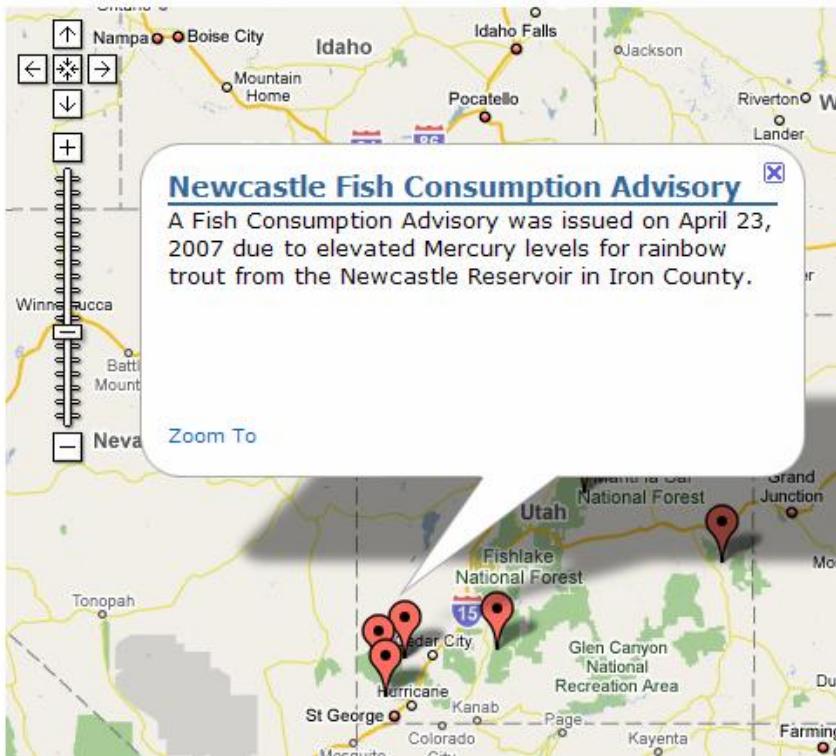
*Chris Fuller, USGS, Menlo Park, CA*



UTAH DEPARTMENT OF  
ENVIRONMENTAL QUALITY

# PROBLEM

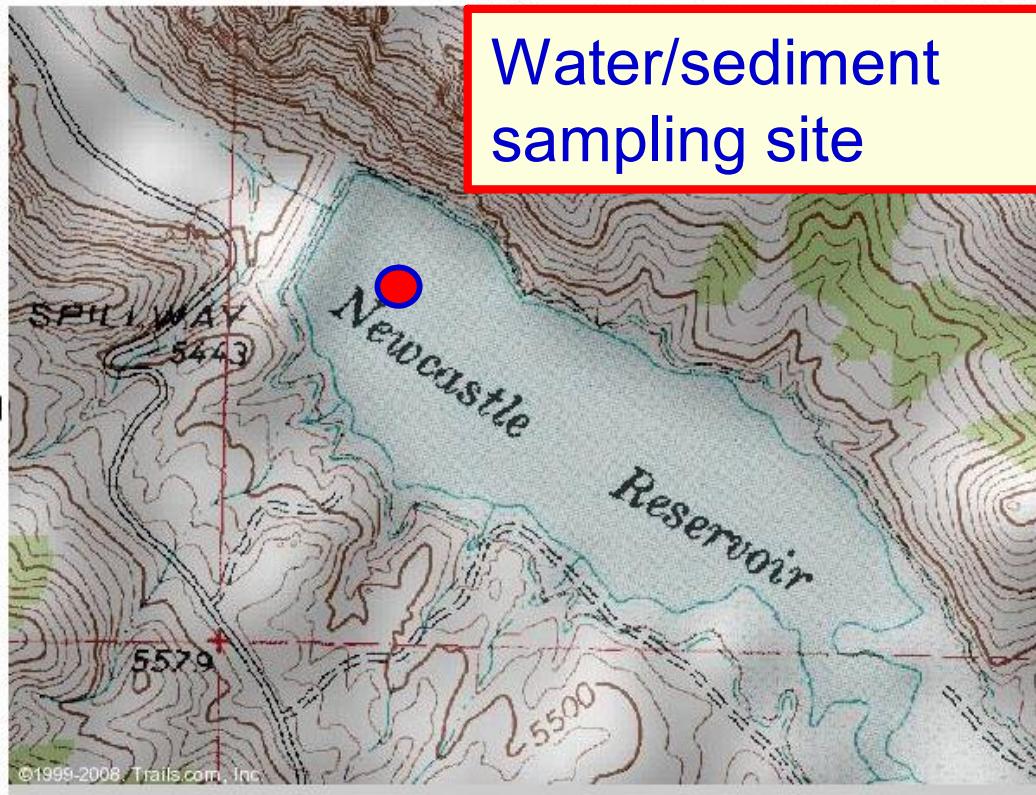
## Map of Utah Fish Advisories



Stocked trout in Newcastle Reservoir are accumulating elevated levels of Hg ( $\geq 0.3$  mg/kg wet wt.) within a few months of their release date



# LOCATION

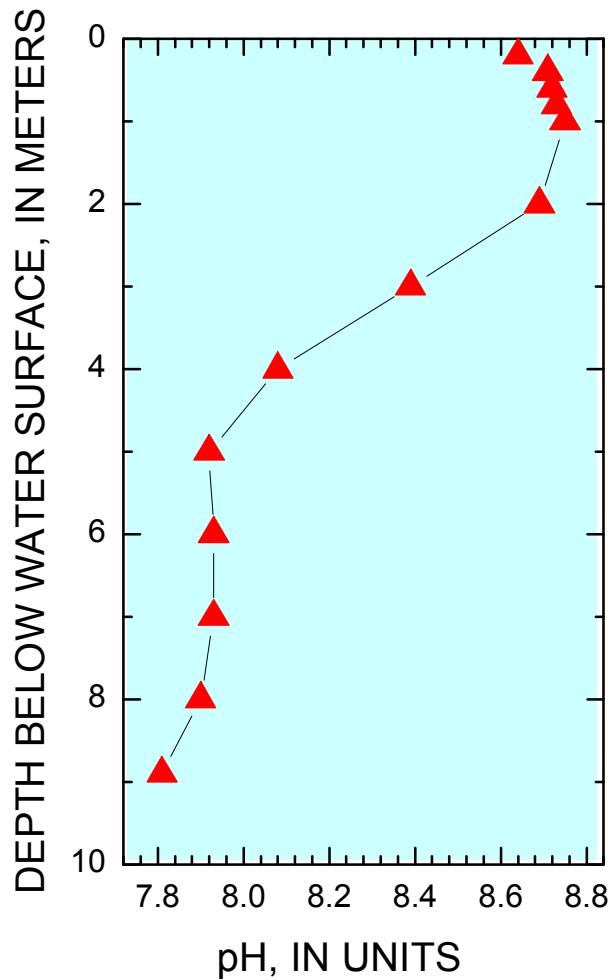
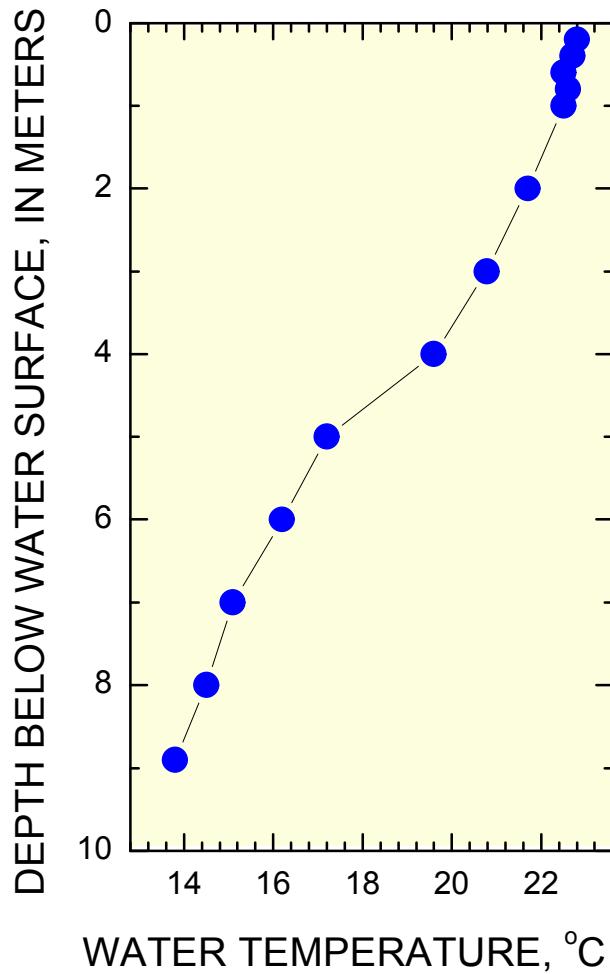


- ◆ Reservoir dam completed in **1956**
- ◆ Spillway height raised 10 ft in **1974**
- ◆ Water and sediment sampled during July 2007
- ◆ No discharge from spillway

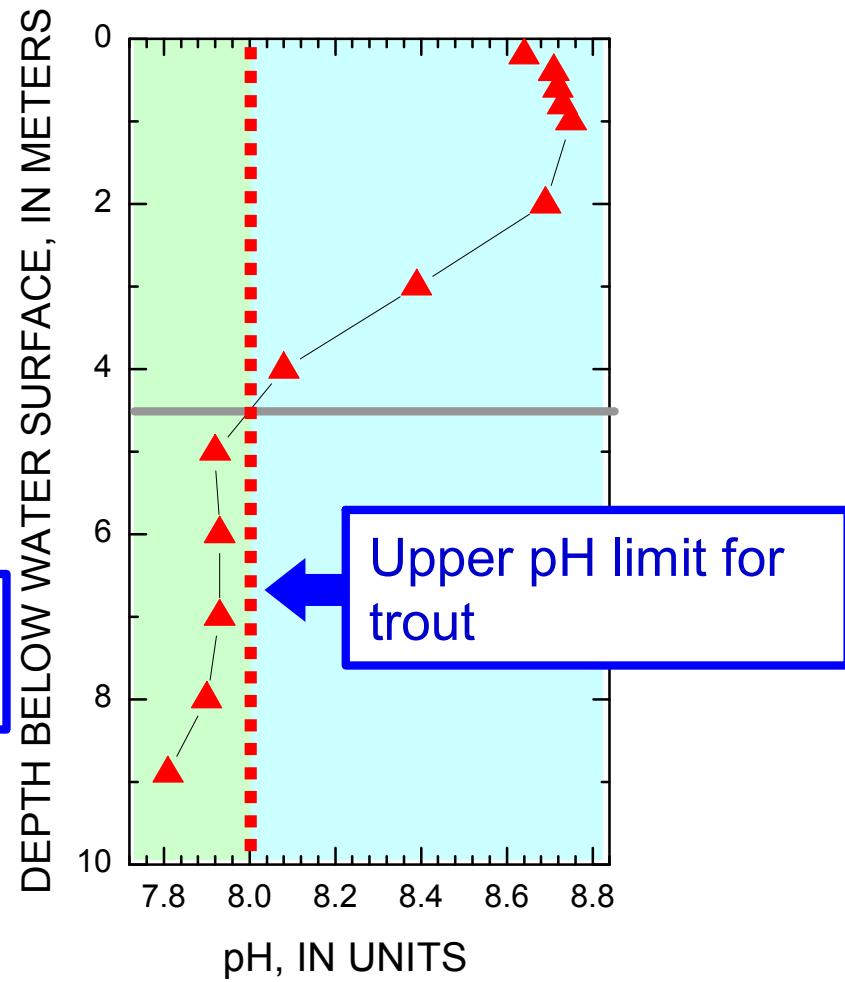
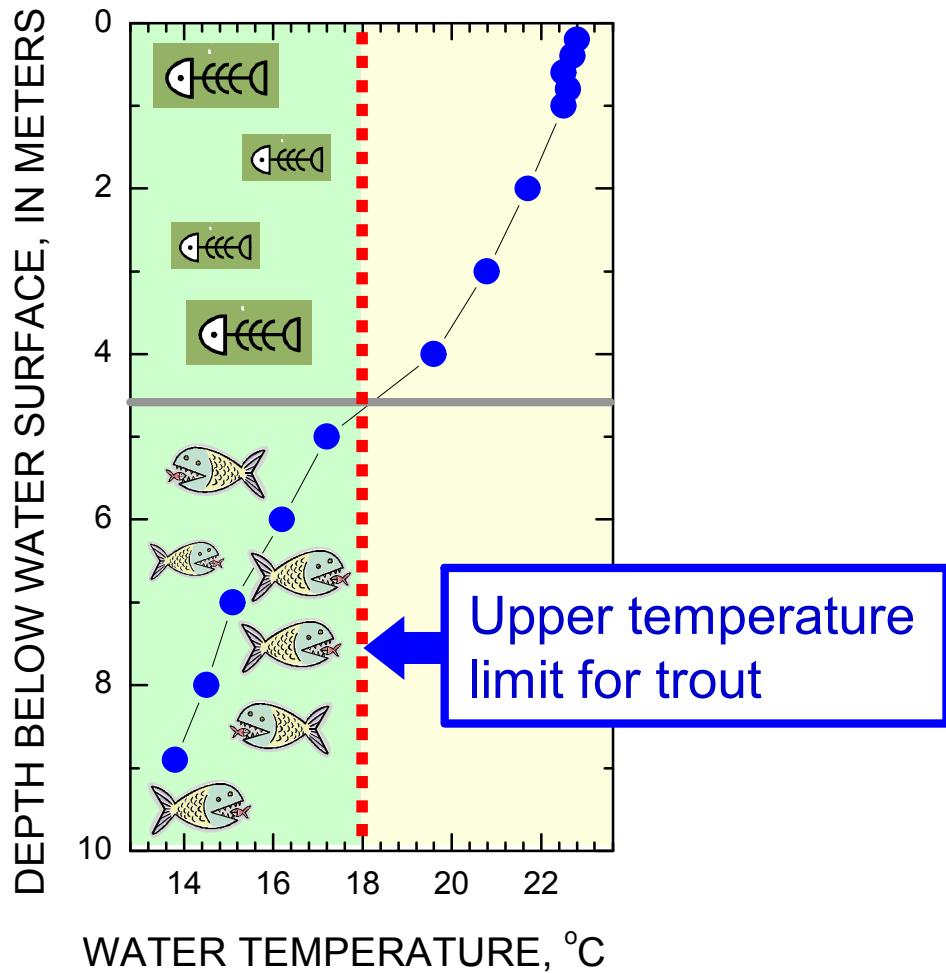
# TOPICS

- ◆ Water column profile
- ◆ Trout distribution by depth
- ◆ Water column mercury profile
- ◆ Sediment core results

# LAKE PROFILING

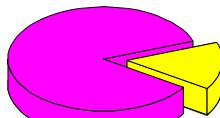
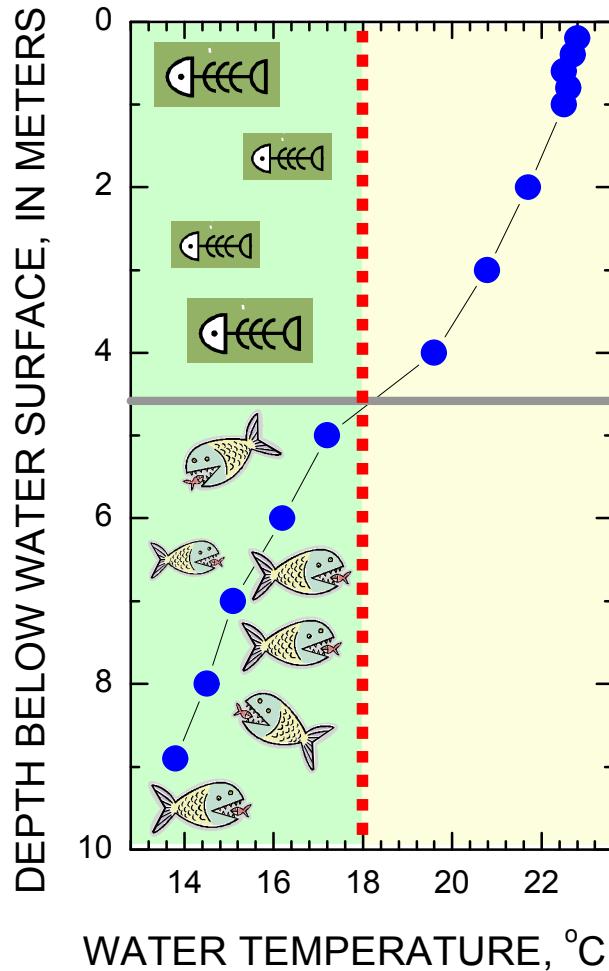


# TROUT HABITAT



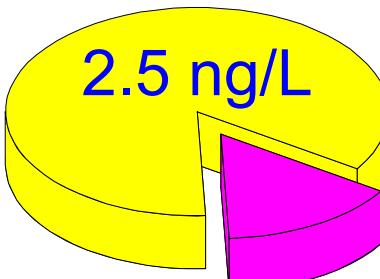
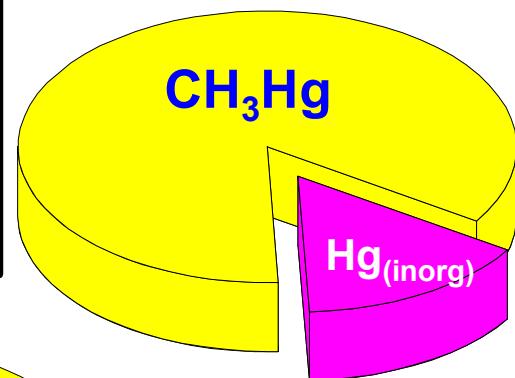
Upper pH limit for trout

# MERCURY DISTRIBUTION



0.2 ng/L  
[1.45 ng/L]

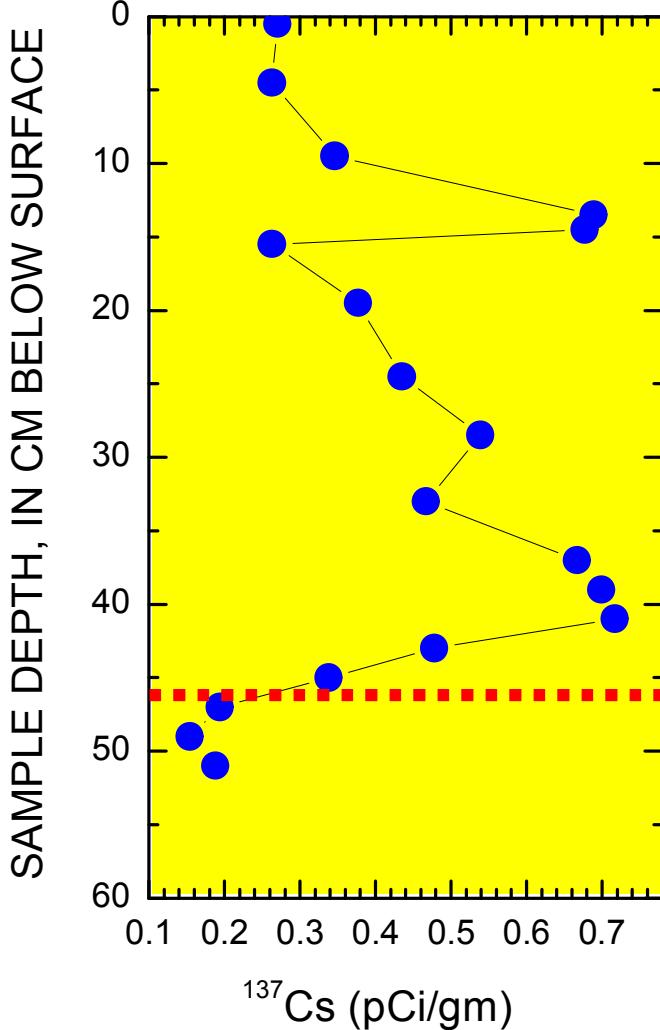
## Explanation



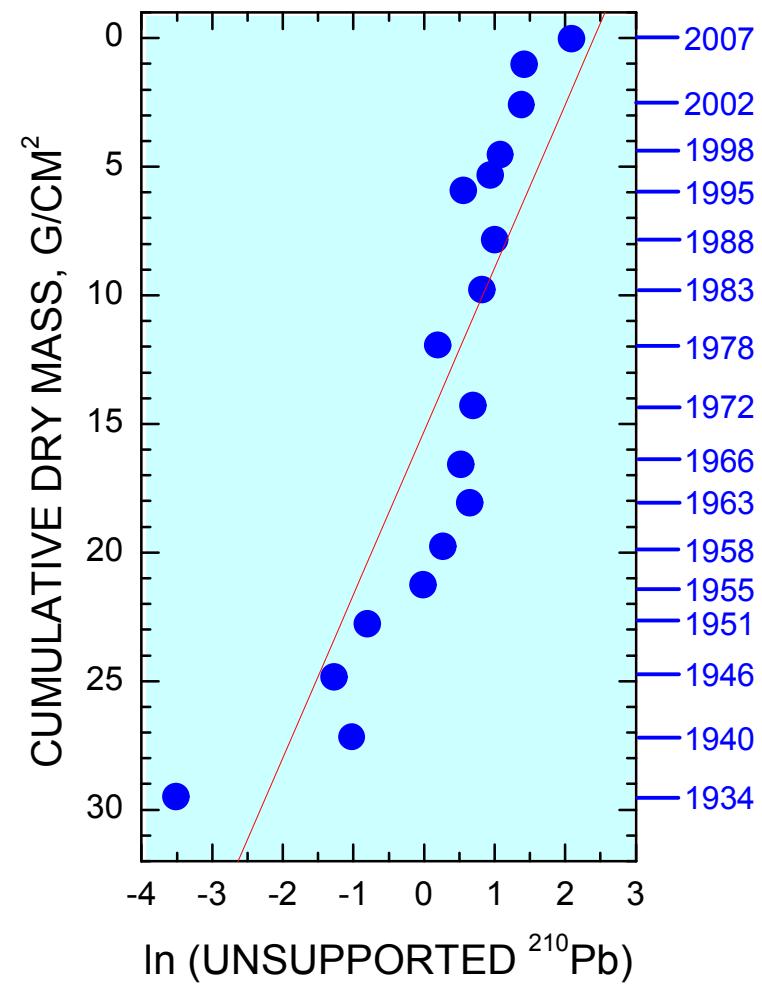
[ $\text{Hg}_{\text{Tot}}$ ]  
whole water

# SEDIMENT CORE CHRONOLOGY

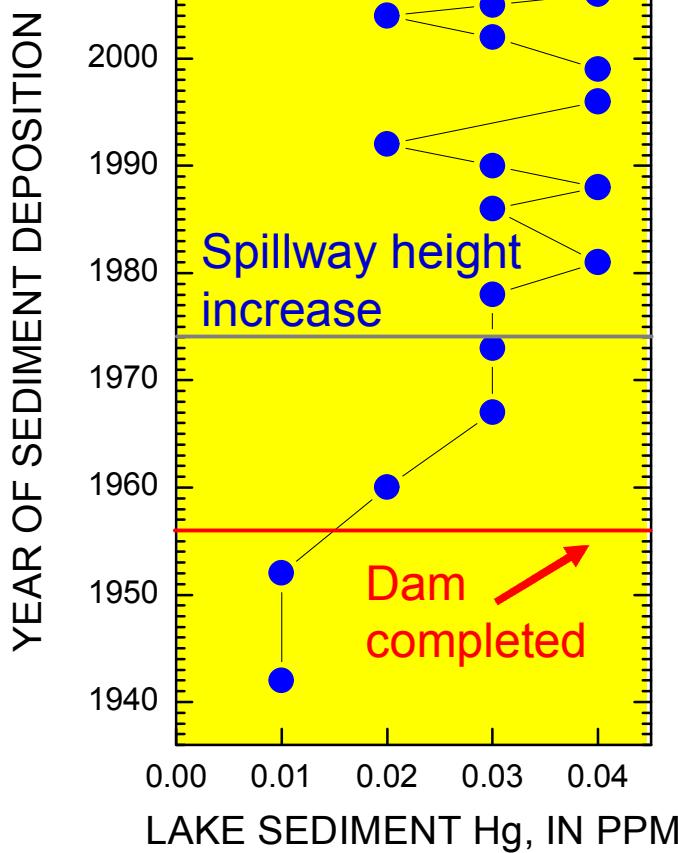
## <sup>137</sup>Cesium results



## <sup>210</sup>Lead results

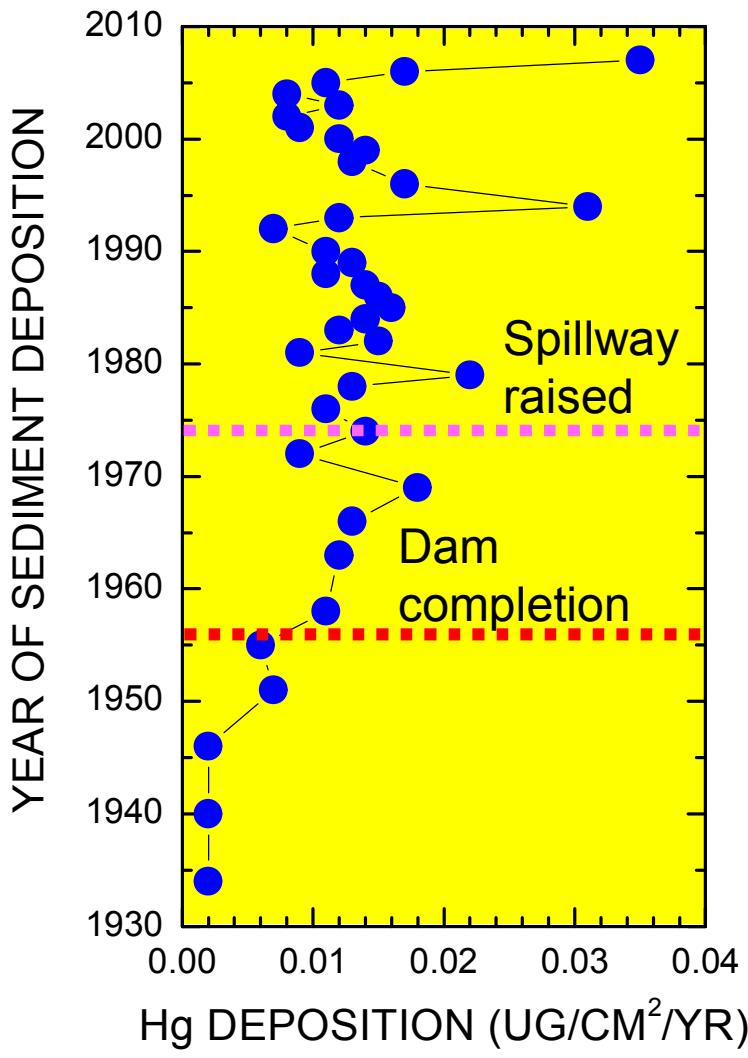


# HISTORIC MERCURY CONCENTRATION



*Portable coring platform, Newcastle Reservoir, Utah*

# HISTORIC MERCURY DEPOSITION RATES



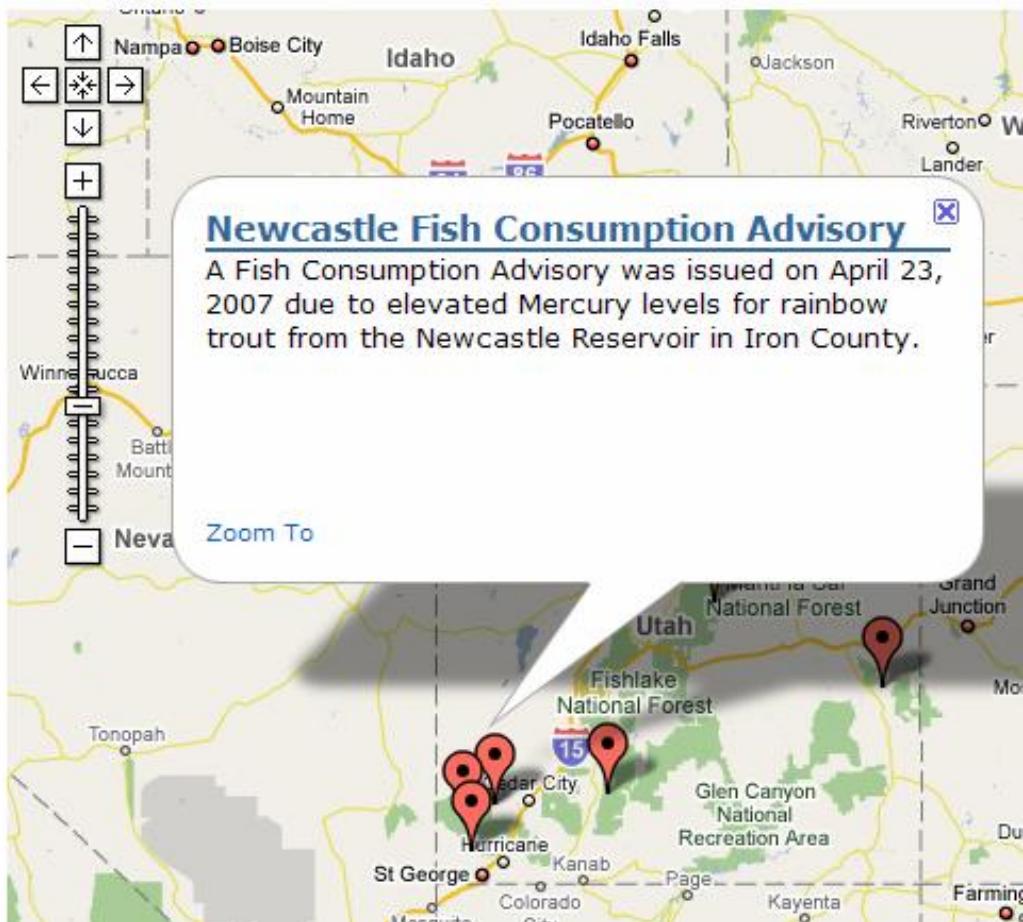
$$\frac{\text{Dry mass (g/cm}^2) * \text{Hg conc. } (\mu\text{g/g})}{\text{deposition period (yrs)}}$$



*Sediment core, Newcastle Reservoir, Utah*

# MANAGEMENT IMPLICATIONS

## Map of Utah Fish Advisories



- ◆ Stocking of warm-water fish
- ◆ Decrease spillway height
- ◆ Modify stocking schedule
- ◆ Similar profiles in other S. Utah reservoirs?

# APPLICATION TO LAKE POWELL Hg CYCLING

- ◆ Epilimnion vs. hypolimnion Hg distributions
- ◆ Historical reconstruction of Hg deposition rates
- ◆ Hg loads from resaturation of deltaic sediments
- ◆ NPS/USGS Water Quality Partnership Program proposal



ELSEVIER

Contents lists available at ScienceDirect

Applied Geochemistry

journal homepage: [www.elsevier.com/locate/apgeochem](http://www.elsevier.com/locate/apgeochem)



## Anthropogenic influences on the input and biogeochemical cycling of nutrients and mercury in Great Salt Lake, Utah, USA

David Naftz<sup>a,\*</sup>, Cory Angeroth<sup>a</sup>, Terry Kenney<sup>a</sup>, Bruce Waddell<sup>b</sup>, Nathan Darnall<sup>b</sup>, Steven Silva<sup>c</sup>, Clay Perschon<sup>d</sup>, John Whitehead<sup>e</sup>

<sup>a</sup> US Geological Survey, Salt Lake City 84119, UT, United States

<sup>b</sup> US Fish and Wildlife Service, Salt Lake City, UT, United States

<sup>c</sup> US Geological Survey, Menlo Park, CA, United States

<sup>d</sup> Utah Division of Wildlife Resources, Salt Lake City, UT, United States

<sup>e</sup> Utah Department of Environmental Quality, Salt Lake City, UT, United States